



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/007,274	10/22/2001	Heizaburo Kato	5280-000005	3563
27572	7590	08/24/2004	EXAMINER	
HARNESS, DICKEY & PIERCE, P.L.C. P.O. BOX 828 BLOOMFIELD HILLS, MI 48303			CADUGAN, ERICA E	
			ART UNIT	PAPER NUMBER
			3722	
DATE MAILED: 08/24/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/007,274	Applicant(s) KATO, HEIZABURO	
	Examiner Erica E Cadugan	Art Unit 3722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 4/12/04 (remarks) and 6/1/04 (clm amdts).
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15 and 17-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15 and 17-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 15 and 17-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claim 15 recites the limitation "said housing" in line 3, for example. There is insufficient antecedent basis for this limitation in the claim. (It is noted that in the amendment to the claims filed November 14, 2003, i.e., the amendment to which the last office action mailed January 21, 2004 responded, in claim 15, line 2, "a house" was previously "a housing".)

Claim Rejections - 35 USC § 103

4. Claims 15 and 19, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 3,750,494 (Rice).

Rice teaches a rotary indexing table 11 (see Figures 1-2, for example) having a plurality of work stations 12 (Figure 1, col. 3, lines 34-40, for example). Additionally, Rice teaches a base or frame 22, constituting a "housing", which "housing" 22 supports a shaft 18 driven by actuator 23 (Figure 1, col. 4, lines 30-32, for example). The actuator 23 ultimately drives the table 11 in rotation via the shaft 18 and cams 14 and cam followers 16 (Figures 1-2, col. 4, lines 4-9, for example).

Additionally, the "housing" 22 has a "gap" therein, including (but not limited to) the cavity 24. Also note that Rice explicitly teaches, in col. 3, lines 38-40, that the cams 14 can be

Art Unit: 3722

made integral with the table 11, and thus the space between the upper surface of the housing 22 at 26 and the lower surface of a cam member 14 integral with the table at the location 26 can be considered the claimed “space”. Rice specifically teaches that there is lubricant in cavity or “gap” 24, and further specifies that the cavity 24 is full enough of lubricant to lubricate the surfaces 26 (col. 4, line 57-61, also Figure 2). Note that the lubricant described by Rice would appear to encompass oil.

Regarding the oil “flow” from the “gap” 24 into the “space”, firstly it is noted that as previously described, Rice teaches that the gap 24 is sufficiently full of lubricant to lubricate surfaces 26, and thus there is lubricant present in the claimed “space”. Secondly, specifically regarding the flow, it appears to be inherent that if the cavity is as full of lubricant as was described previously, that the momentum of the table would cause the lubricant to “flow”, at least momentarily, into the space from the gap at the time of stopping and/or immediately thereafter.

In the alternative, Rice does not explicitly state that the lubricant used is oil, although this would appear to be implicit via the description of the cavity as “sufficiently full” (col. 4, lines 57-61).

Regarding the lubricant, Examiner takes Official Notice that the use of oil as a lubricant is notoriously well-known in the art. Since Rice does not provide a teaching prohibiting the use of oil as such a lubricant, the substitution of a well-known lubricant (e.g., oil) for the generically taught “lubricant” would therefore have been obvious to one having ordinary skill in the art at the time the invention was made since it would have been an obvious matter of design choice to a person of ordinary skill in the art to choose

Art Unit: 3722

any of a number of types of well-known lubricants, depending on the particular requirements of an end user, to enjoy any of the known benefits that accrue thereto. For example, such choice could be made based on the availability of a particular lubricant at the time of design.

Rice teaches all aspects of the claimed invention as described in the above rejection based thereon, but is silent about the dimensions of the described “space”.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have made such dimension whatever value or range of values was desired or expedient to an end user, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

5. Claims 15, 17, 19, and 20, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over British Patent No. 608,048 (hereinafter ‘048) in view of U.S. Pat. No. 5,243,869 (Kukowski).

‘048 teaches a rotating table apparatus including a driven shaft 6 supported by a bearing member 7, which bearing member forms a portion of a “housing” 7. The table is driven in rotation by a worm 3 (driven by shaft 6, which is driven by an “actuator, see page 2, lines 14-17, also Figures 1-2), analogous to the “roller gear cam” of the present invention, which drives a helical wheel 2 that is rigidly connected to the plate 1, wheel 2 is analogous to the “cam followers” of the present invention. Note that the plate 1 has a lower surface (as viewed in Figure 1) that opposes an upper surface of stationary nut 9 (page 2, line 40), which nut forms a part of the “housing” along with bearing member 7 and support 15, for example, providing

Art Unit: 3722

chamber or “space” 24 therebetween (between the described upper and lower surfaces). Also note that the aforescribed lower surface of the table is considered an “end” surface of the table in that it is an end surface of the disc portion of plate 1, see Figure 1. Additionally, ‘048 teaches that “housing” portion or bearing member 7 includes an oil reservoir located within a “gap” therein (Figure 1, also page 2, lines 64-82). Note that ‘048 specifically teaches that the oil reservoir is “linked” to the chamber 24 (page 2, lines 64-82), and also teaches that the oil is used for lubricating the worm 3 and the wheel 2 (page 2, lines 67-88, for example, also Figure 1).

Regarding the limitation from claim 15 “and a portion of said oil flows from said gap portion into said space”, it is noted that there appears to be nothing preventing ‘048’s device from so functioning. Note that if the rotation of the table is stopped in such a position that the cam 18 is providing the downward motion of the piston 19, it appears that, at least momentarily (beyond the stopping), oil would continue to flow into chamber 24 (see page 2, lines 68-82, for example).

Regarding claim 17, it is noted that the plate 1 taught by ‘048 appears to be capable of performing the functionally claimed “intermittent” rotation, for example, via intermittent actuation of the gearbox that ultimately drives the worm 3 (page 2, lines 11-17 teach about the gearbox driving the worm). Note that no structure of the cam is set forth that requires the intermittent rotation to be as a result of any continuous rotation of the cam, and it is noted that the device is inherently capable of such intermittent actuation of the gearbox, via, for example, manually connecting and disconnecting the gearbox to its driver or power source.

Regarding claim 19, it is noted that ‘048 sets forth that plate 1 is a “work-carrying plate in a metal cutting machine tool” (p. 1, lines 10-12, for example). In order for the plate to hold

Art Unit: 3722

the work such that it does not fall off the table when being machined, it is necessary that it be held or fixed to the table by some sort of device, i.e., the forces applied to a workpiece by a machine tool during cutting are great enough to require that the workpiece be held in some way to prevent the workpiece from flying off of the table during the cutting process. Thus, inherently, in order for '048's plate device to be functional with a "metal cutting machine tool" as disclosed, there must be some sort of holding device, which device is considered to be a "chuck".

Regarding claim 20, it is noted that '048 teaches the use of a felt member 29 inserted in a circular groove of cover 31, which is shown in Figure 1 as being bolted to support member 15, and thus is considered part of the "housing" (see Figure 1 and page 2, lines 96-99). Note that this member 29 is thus located "between" the "table" 1 and the aforescribed "housing" (see Figure 1). Note also that positioned as it is (shown in Figure 1), the member 29 will inherently serve as a "seal" for preventing the oil from leaking from the gap portion (to the outside of the device), at least temporarily, since it serves as a physical barrier to the oil flowing out at the location of the member 29.

'048 teaches the worm 3 and wheel 2 drive instead of a "roller gear cam" and "cam followers". Additionally, '048 is silent as to the dimensions of the described "space", and thus does not teach the dimensions set forth in claim 15.

Kukowski teaches a cam operated indexing drive including a cam body 30 and plate member 35 with followers 36 (see Figure 1, for example). Kukowski further teaches that cam operated indexing drives have high mechanical efficiencies and zero backlash (col. 1, lines 24-25, for example).

Art Unit: 3722

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have substituted the cam operated drive taught by Kukowski for the worm and worm wheel taught by '048 for the purpose of increasing the mechanical efficiency and eliminating any backlash of '048's drive system as taught by Kukowski.

Regarding the dimensions of claim 15, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have made the space whatever size was desired or expedient, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Allowable Subject Matter

6. Claim 18 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter: U.S. Pat. No.'s 3,750,494 to Rice and 4,896,560 to Kato and British Patent 608,048 ('048) are representative of the closest prior art of record as set forth in dependent claim 18. Rice and '048 have been discussed in detail both in the immediately preceding office action (mailed January 21, 2004) and in the present office action. Kato was discussed in detail in the office action mailed January 21, 2001.

Suffice it to say, Rice and '048 both teach indexing devices having the oil, the gap, the space, and the housing as set forth in the Jan. '04 action as well as above. However, both Rice and '048 are silent as to the dimension of the claimed "space", and thus neither Rice nor '048

Art Unit: 3722

teach that the space is “between 0.005 mm and 0.2 mm” as set forth in independent claim 15.

Additionally, regarding dependent claim 18, both Rice and ‘048 are directed to indexing devices for indexing a work-carrying table or plate (see ‘048 page 2, lines 11-12, see Rice col. 1, lines 1-8, for example), rather than a rotating table in which a “tool is provided” as set forth in claim 18.

However, to provide the rotating table of either of Rice or ‘048 with a tool would appear to preclude the devices of Rice and ‘048 from functioning as intended, i.e., to rotate a workpiece.

Alternatively, Kato teaches an indexing device 8 for indexing a turret 30 having cutting tool 32 affixed thereto (Figures 1-2, col. 1, lines 6-21, also col. 5, lines 2-5). Kato’s indexing device includes a globoidal cam 36 and cam followers 40 (see Figure 3).

However, Kato does not teach any sort of lubricating device for keeping the driving parts lubricated.

However, even assuming arguendo that it would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided the lubrication system with the gap, space, etc. of either of Rice or ‘048 to the indexed tool turret taught by Kato, it is noted that the present invention as set forth in dependent claim 18 would still not result, because both Rice and ‘048 are silent as to the dimensions of the claimed “space”. Thus, in order to arrive at the invention as claimed in claim 18, a modification of a modifying reference would be necessary, which would only result from impermissible hindsight reasoning.

The aforediscussed prior art being representative of the closest prior art of record to the present invention as set forth in dependent claim 18, thus, for at least the foregoing reasoning, the prior art of record neither anticipates nor renders obvious the present invention as set forth in dependent claim 18.

Art Unit: 3722

Response to Arguments

8. Applicant's arguments filed April 12, 2004 have been fully considered but they are not persuasive. Some of Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection, and accordingly, applicant's attention is directed to the above rejections. However, Examiner will address those arguments which still pertain.

Also note that the Examiner's assertion (that a "the use of oil as a lubricant is notoriously well-known in the art") is taken to be admitted prior art because Applicant did not previously traverse the Examiner's assertion. See MPEP section 2144.03, section C, for example.

Firstly, Applicant has asserted the following:

Now, turning to Rice, it is disclosed in Rice that "[the] case 22 also provides bearing support at surfaces 26 for cam blocks 14 which in turn supports the loading of the table". (Please refer to Col. 4, lines 47-49, and Fig. 2.) In other words, in Rice, the surfaces 26 directly receive the loading of the table via the cam blocks 14. (It is these surfaces 26 that are lubricated by the lubricant.) Since the surfaces 26 serve to receive the load from the table, there could not be any space between the surfaces 26 and the cam blocks 14 (and this is apparent also from Fig. 2). Therefore, Rice could not, and does not, teach the structure in which the "space is between 0.005 mm and 0.2 mm", and therefore, claim 15 is not anticipated or rendered obvious by Rice alone or in combination with other references of record.

However, this is not persuasive. As admitted by Applicant and explicitly taught by Rice, the surfaces 26 receive lubricant, and as explicitly taught by Rice, "[a] small peripheral air gap 30 between case 22 and table is preferred and may also include journal means, but allows the cavity 24 to run sufficiently full of lubricant to lubricate surfaces 26 where this is desired".

Since lubricant is received on the surface 26 (i.e., as opposed to being impregnated within housing 22) as described by Rice and admitted by Applicant, there inherently is some space between the surface 26 and the lower surface of the cam blocks 14 (which can be made integral with the table 11 as explicitly stated in Rice and described in the above rejection based thereon),

Art Unit: 3722

however small, or else the lubricant could not be received there. The fact that the bearing surfaces 26 “support the loading of the table” as described by Applicant and set forth in Rice in col. 4, lines 47-49 is irrelevant to the fact that some at least minor space must be present in order for the lubricant to fit there. In such case, the surface 26 would bear the table load via the lubricant. See, for example, the Modern Tribology Handbook, Vol. 1, Principles of Tribology, the first and second pages of Chapter 12, and especially the first paragraph under heading 12.1.1, which states:

When the contact geometry and the operating conditions are such that the load is fully supported by a fluid film, the surfaces are completely separated. This is generally referred to as the hydrodynamic lubrication.

Note also that Lubrication Fundamentals, page 89 teaches hydrodynamic fluid film thicknesses “usually in excess” of 25 μ m thick (see the paragraph beginning “[t]wo types of hydrodynamic film lubrication...”), which includes thicknesses within the range of present claim 15 (noting that the range of between 0.005 mm and 0.2mm is the same as a range between 5 μ m and 200 μ m), which serves as evidentiary support that, not only can the housing support the load of the table via the lubricant, but that lubricant film thicknesses within the claimed range are usual.

Additionally, on pages 7-8 of the remarks filed April 12, 2004, Applicant has made a number of assertions regarding whether or not Rice’s device provides any “damping effect”. However, these remarks and assertions do not appear to be relevant as it is noted that the features upon which applicant relies (i.e., any “damping”) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification

Art Unit: 3722

are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant has also asserted that '048 "does not teach this chamber to be between 0.005 mm and 0.2 mm". However, it is noted that Examiner noted that '048 was silent as to the dimension of the space 24 and did not rely on the teachings of '048 to teach this feature; see the above rejection based upon '048.

Applicant has also asserted that "[a]ccording to '048, the chamber is too large", because "it is necessary to make the space of the chamber 24 large enough so that the chamber 24 is able to supply the oil sufficiently to the place where lubrication is required". However, while Applicant has asserted that the "chamber is too large", apparently based on the fact that the chamber must be of a size to permit oil to flow, to be made of a size within the claimed range. However, this is not persuasive. Again, it is noted that '048 is silent as to the specific dimension of the space. Furthermore, as noted above from the teachings of Lubrication Fundamentals, page 89, a lubricant can operate in a very small space, such as one on the order of 25µm thick, which is within the claimed range.

Applicant has also asserted that

Since the space of the chamber 24 of '048 is large, the oil therein cannot function as a damper. Further, a person skilled in the art would not come up with the idea of making the space h of the chamber 24 small so as to increase the damping coefficient c to obtain a damping effect, because the chamber is intended only for supplying lubricant between the plate 1 and the member 9.

However, it is again noted these remarks and assertions do not appear to be relevant as it is noted that the features upon which applicant relies (i.e., any "damping") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations

Art Unit: 3722

from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

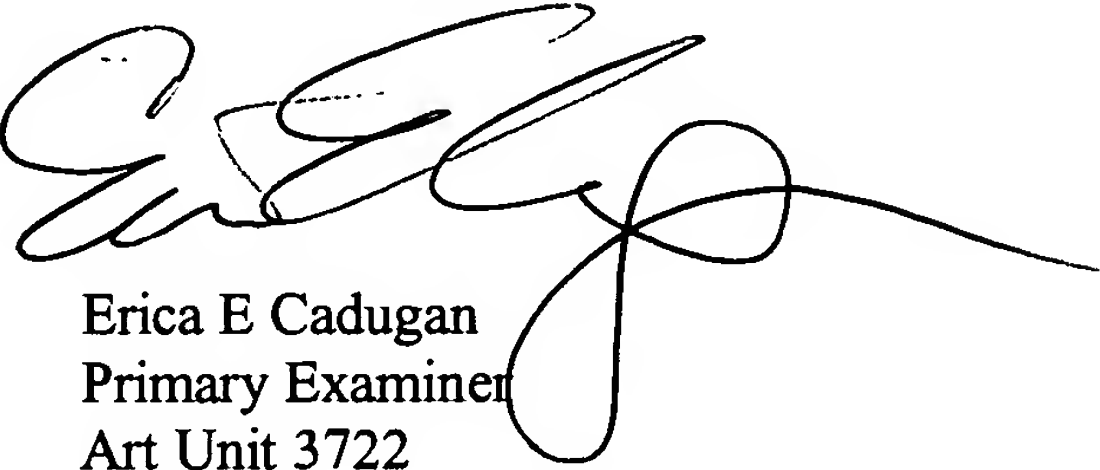
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Faxing of Responses to Office Actions and Contact Information

10. In order to reduce pendency and avoid potential delays, TC 3700 is encouraging FAXing of responses to Office Actions directly into the Group at (703) 872-9306. This practice may be used for filing papers not requiring a fee. It may also be used for filing papers which require a fee by applicants who authorize charges to a PTO deposit account. Please identify the examiner and art unit at the top of your cover sheet. Papers submitted via FAX into TC 3700 will be promptly forwarded to the examiner.

Art Unit: 3722

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erica Cadugan whose telephone number is (703) 308-6395. The examiner can normally be reached on Monday through Thursday from 7:30 a.m. to 5:00 p.m., and every other Friday from 7:30 a.m. to 4:00 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, A.L. Wellington can be reached at (703) 308-2159. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 3700 receptionist whose telephone number is (703) 308-1148.



Erica E Cadugan
Primary Examiner
Art Unit 3722

eec
August 18, 2004